WHAT IS CLAIMED:

Claim 1.

A high pressure pump comprising a housing and a cylinder in said housing wherein a shaft-like plunger makes a reciprocating motion in the bore formed in said cylinder to compress a fluid; said high pressure pump characterized in that:

one end of said plunger is connected to a compression chamber for compressing the fluid, while the other end is connected to a reciprocating motion drive source through a member; wherein a transverse aperture is connected with the bore through a cylindrical groove provided halfway through the cross section of the bore of said cylinder in the axial direction; and the clearance between said bore and said plunger varies depending on the specified position of either said plunger or bore.

Claim 2.

The high pressure pump according to Claim 1 characterized in that $Ga \leq Gb < Gc$ or $Ga < Gb \leq Gc$, wherein:

Ga denotes a clearing between the bore on the portion from said compression chamber to said cylindrical groove and said plunger;

Gb a clearance closer to the cylindrical groove,

out of the clearances between the bore from said cylindrical groove to the drive source side and said plunger; and

Gc a clearance closer to the drive source side, out of the clearances between the bore from said cylindrical groove to the drive source side and said plunger.

Claim 3.

The high pressure pump according to Claim 2 characterized in that $Da \leq Db < Dc$ or $Da < Db \leq Dc$ wherein:

Da denotes an inner diameter of the bore on the portion from said compression chamber to said cylindrical groove;

Db an inner diameter closer to the cylindrical groove, out of the inner diameters of the bore from said cylindrical groove to the drive source side; and

Dc an inner diameter closer to the drive source side, out of the inner diameters of the bores of the cylinder from said cylindrical groove to the drive source side.

Claim 4.

The high pressure pump according to Claim 2 characterized in that $Gc \leq ((La + W + Lbc)/La) \times Ga$ or $Dc \leq ((La + W + Lbc)/La) \times Da$ wherein:

La is the width of said cylinder bore in the axial direction on the portion from the compression chamber to the cylindrical groove;

W the width of said cylindrical groove in the axial direction; and

Lbc the width of the portion from the cylindrical groove to the drive source side.

Claim 5.

The high pressure pump according to Claim 3 characterized in that $Gc \leq ((La + W + Lbc)/La) \times Ga$ or $Dc \leq ((La + W + Lbc)/La) \times Da$ wherein:

La is the width of said cylinder bore in the axial direction on the portion from the compression chamber to the cylindrical groove;

W the width of said cylindrical groove in the axial direction; and

Lbc the width of the portion from the cylindrical groove to the drive source side

Claim 6.

A high pressure pump comprising a housing and a cylinder in said housing wherein a shaft-like plunger makes a reciprocating motion in the bore formed in said cylinder to compress a fluid; said high pressure pump characterized in that one end of said plunger is connected to a compression chamber, while the other

end is connected to a reciprocating motion drive source through a member; wherein a transverse aperture is connected with the bore through a cylindrical groove provided halfway through the cross section of the bore of said cylindrical groove in the axial direction; the longitudinal section of said cylindrical groove exhibits a form gradually widening toward the bore of said cylinder, and the angle formed at the portion where said cylindrical groove contacts the bore is 5 degrees or more, but not more than 25 degrees with respect to axial direction of the bore.

Claim 7.

The high pressure pump according to Claim 6 characterized in that the width W of said cylindrical groove in the axial direction is D × 0.1 or more, but not more than D × 0.6 with respect to the inner diameter D of the bore.

Claim 8.

A high pressure pump manufacturing method characterized in that, with respect to the conditions for honing the bore on the portion from the compression chamber of a pump cylinder to a cylindrical groove, the conditions for honing the bore on the portion from said cylindrical groove to the drive source side is determined by changing one or

more of the axial feed rate, honing stone speed, number of reciprocating motions and axial feed dwell time of said honing tool.

Claim 9.

The high pressure pump manufacturing method according to Claim 8 characterized in that the conditions of changing one or more of the axial feed rate, honing stone speed, number of reciprocating motions and axial feed dwell time of said honing tool are the conditions for honing the bore on the portion connected to said cylindrical groove, with respect to said conditions for honing the bore on the portion from the compression chamber of the pump cylinder to the cylindrical groove and said conditions for honing the bore on the portion from said cylindrical groove to the drive source side.

Claim 10.

The high pressure pump manufacturing method according to Claim 8, said pump characterized in that $Ga \leq Gb < Gc$ or $Ga < Gb \leq Gc$, wherein:

Ga denotes a clearing between the bore on the portion from said compression chamber to said cylindrical groove and said plunger;

Gb a clearance closer to the cylindrical groove, out of the clearances between the bore from said

cylindrical groove to the drive source side and said plunger; and

Gc a clearance closer to the drive source side, out of the clearances between the bore from said cylindrical groove to the drive source side and said plunger.

Claim 11.

The high pressure pump manufacturing method according to Claim 8, said pump characterized in that the longitudinal section of said cylindrical groove exhibits a form gradually widening toward the bore of said cylinder, and the angle formed at the portion where said cylindrical groove contacts the bore is 5 degrees or more, but not more than 25 degrees with respect to axial direction of the bore.